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Commentary

Asbestos Penetration of the Gastrointestinal Tract

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My comments are restricted to studies involving gastrointestinal exposure of humans and animals to asbestos via the diet or intubation. There have been three studies designed to determine whether human ingestion of asbestos in drinking water could result in the detection of asbestos in urine or postmortem tissues (*1–3*). One study concluded that ingested asbestos could not be found in human urine (*1*). However, other studies found evidence that ingested asbestos could penetrate the GI tract, migrate, and be recovered in urine and tissues (*2,3*). These two positive human studies were uncontrolled to the extent that inhaled asbestos may have contributed to the positive findings. Hence, we look to controlled animal studies for confirmation of the human findings, especially with regard to dose.

There have been at least 12 animal studies involving rats and baboons (*4–15*). Five rat studies (*4–8*) and two baboon studies (*8–10*) presented evidence of asbestos penetration of the GI tract and/or migration to various tissues. Three rat studies (*11–13*) and two baboon studies (*14, 15*) found little or no evidence of penetration and migration.

The positive animal findings (*4–10*) are not completely convincing for various reasons: (a) the number of fibers observed on a grid opening basis was quite small (*8, 10*); (b) the qualitative presentation of data prevented numerical comparisons of test and control fiber count data (*4,6*); (c) too few control data were obtained (*7*); and (d) fiber count data were reported in terms of fibers per milligram or milliliter (*5*). Unless fiber count data are given in terms of fibers per grid opening, it is not possible to know whether the authors' conclusions are based on the observation of one or hundreds of fibers. Given the problem of background contamination, positive results are always more credible if they are based on the actual observation of many fibers.

The negative animal studies are not completely convincing because the asbestos recovery of the sample preparation and analysis techniques were not demonstrated (*11–15*). It is possible that the methods used in these studies were not capable of detecting low levels of asbestos fibers in tissues.

Two additional studies are in progress in our laboratory. These will be completed in early 1983. Mark Finn is nearing completion of a study with two main objectives. The first objective is to compare three methods of sample preparation on the bases of accuracy, precision, and recovery. The three methods include the EPA interim methodology on ashed and unashed samples, condensation washing of unashed samples, and acetone-droplet transfer of ashed samples. Finn's second objective is to evaluate urine as a biological index of worker exposure to airborne asbestos (using the EPA provisional methodology).

Janet Kaczinski will complete a reevaluation of the baboon tissues reported on earlier (*15*). She is using the EPA provisional methodology instead of the acetone-droplet transfer technique used previously. Finn's research has shown that the recovery of the EPA provisional methodology is better than that of the acetone-droplet technique. Kaczenski has documented the recovery of her tissue preparation technique by analyzing asbestos-spiked tissue digests. Also, she is analyzing a relatively large amount of each tissue, 5 g wet weight.

The views and policies presented by the author in this commentary do not necessarily reflect those of the U.S. Environmental Protection Agency. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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